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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/517,127	03/02/2000	Scott E. Moore	MI22-1246	4844
21567	7590	09/21/2007		
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER ELEY, TIMOTHY V	
			ART UNIT 3724	PAPER NUMBER
			MAIL DATE 09/21/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

09/517,127

Applicant(s)

MOORE ET AL.

Examiner

Timothy V. Eley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5, 10, 11, 13-17, 39, 41-48, 58-62, 133-135, 165-167, 177 and 179-181 is/are allowed.
- 6) ☒ Claim(s) 18-20, 22-28, 31-33, 49-51, 53-57, 63-65, 67, 130, 138-143, 152-163, 168, 170-175 and 178 is/are rejected.
- 7) ☒ Claim(s) 52, 131, 164 and 169 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

Continuation of Disposition of Claims: Claims pending in the application are 1-5,10,11,13-20,22-28,31-33,39,41-65,67,130,131,133-135,138-143,152-175 and 177-181.

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**DETAILED ACTION**

***Claim Objections***

8. Claims 31, and 143 are objected to because of the following informalities:

- "the sensor"(claim 31, line 1; claim 143, line 9) does not properly refer to the sensor previously recited in claims 27 and 143 respectively, since two sensors are present in the apparatus.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 49,63,64,138,141,142,154-156, and 172 are rejected under 35 U.S.C. 102(e) as being anticipated by Obeng et al(6,048,256), as applied in the rejection filed August 24, 2006.

***Claim Rejections - 35 USC § 103***

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. Claims 140,160-162, and 174 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al(5,755,614).

- Adams et al discloses a semiconductor processor system comprising: inherently a process chamber adapted to process at least one semiconductor workpiece using a process fluid; a process fluid system coupled with the process chamber and including: a recirculation system configured to recirculate the

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process fluid to a homogeneous level; and a sensor coupled with the recirculation system and configured to output a signal indicative of the process fluid; and wherein the sensor is configured to monitor turbidity of the process fluid. See figure 2, column 1, lines 12-14; column 6, lines 58-end to claim 7, lines 1-10, column 7, lines 17-31, and column 7, lines 44-53.

- Adams et al does not state that the recirculation system recirculates the process fluid to a homogeneous level. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to recirculate the process fluid to a homogeneous level in order to adequately process the semiconductor workpiece.
- Regarding claims 160-162, the recirculation system is configured to recirculate the process fluid to a homogeneous level to provide the process fluid having a turbidity within a desired range for application to the process chamber.
- Regarding claim 174, the sensor is configured to monitor a percentage of solids present within a liquid of the process fluid to monitor the turbidity of the process fluid.

13. Claims 27,28,31,33,49-51,53-57,63-65,67,138,139, 141,143,152,153,157-159,168,170-173,175, and 178 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al in view of Obeng et al (6,048,256).

- Adams et al is explained above.

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- Adams et al states that the turbidity sensor is used to control the semiconductor processor system, but does not specifically disclose a control system coupled with the sensor for controlling at least one operation of the semiconductor processor system.
- Obeng et al discloses that it is well known in the art to use a turbidity sensor to control at least one operation of a semiconductor processor system as indicated above.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Adams et al system by providing a control system for controlling at least one operation of the system as taught by Obeng et al, in order to more efficiently process the semiconductor.
- Regarding claims 27 and 141, the system further comprises a mixer configured to mix plural components of the process fluid and the control system as modified is configured to control the mixing system. See column 7, lines 44-53.
- Regarding claims 17, 57, and 67, the process chamber comprises a process chamber of a chemical-mechanical polishing processor. See column 1, lines 12-14.
- Regarding claims 27, 65, and 143, the system further comprises another sensor. See column 6, lines 58-end.
- Regarding claims 28, 64, and 138, the system comprises at least one metering device configured to flow one of the components, and

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the control system as modified is configured to control the metering device to control a flow rate of the component responsive to the system. See column 7, lines 3-7.

- Regarding claims 50 and 51, applicant's broad recitation of horizontal and vertical is met since some part of the connection is horizontal and some part of the sensor is vertical.
- Regarding claims 53, and 139, the system further comprises a recirculation system configured to recirculate process fluid within the connection and wherein the control system as modified is configured to control the recirculation system responsive to monitoring the accumulation. See column 7, lines 17-26.
- Regarding claim 55, the connection comprises a drain connection configured to receive process fluid from the process chamber. See column 7, lines 17-27. Adams et al, as modified, does not state that the recirculation system recirculates the process fluid to a homogeneous level. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to recirculate the process fluid to a homogeneous level in order to adequately process the semiconductor workpiece.
- Regarding claims 152 and 153, gravity inherently will cause the accumulated particulate matter to accumulate within the connection which is arranged to transport the process fluid in a substantially horizontal direction.

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- Regarding claims 157-159, the recirculation system is configured to recirculate the process fluid to a homogeneous level to provide the process fluid having a turbidity within a desired range for application to the process chamber.
- Regarding claim 168, Adams, as modified, teaches a mixing system configured to mix plural components of the process fluid and the control system is configured to control the mixing system to mix the plural components using the signature indicative of the process fluid. Adams in view of Obeng discloses turbidity sensors which may be used for control for controlling the characteristics of the recycled slurry(column 6, lines 58-end), which is thoroughly mixed(column 7, lines 44-53). Thus, the sensor is "configured" to control mixing of the components of the semiconductor workpiece process fluid responsive to the signal indicative of turbidity.
- Regarding claims 170-173,175, and 178, the sensor is configured to monitor a percentage of solids present within a liquid of the process fluid to output the signal indicative of the turbidity of the process fluid, since turbidity is directly related to the percentage of solids present in a particular fluid.

14. Claims 18-20,22-26,32,130, and 163 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al in view of Obeng et al, as applied above, and further in view of Simms(3,713,743), as applied in the rejection filed August 24, 2006.



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- Adams et al, as modified, is explained above.
- Adams et al does not disclose a connection that comprises a connection of a sampling system configured to provide the process fluid in a substantially static state, nor a storage device configured to store historical data corresponding to the process fluid.
- However, Simms discloses that it is well known in the art to provide a storage device configured to store historical data corresponding to a process fluid, and to provide a sampling system configured to provide the process fluid in a substantially static state. See column 4, lines 42-49, and column 9, lines 9-22.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have further the Adams et al system by providing a connection that comprises a sampling system configured to provide the process fluid in a substantially static state, and a storage device configured to store historical data corresponding to the process fluid, as taught by Simms, in order to make the system more efficient.
- Regarding claims 3,4, and 20, inherently, as modified, the static process fluid must be compared with a signature(or desired amount of turbidity).

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- Regarding claim 5, it would have been obvious to one having ordinary skill in the art at the time the invention was made to halt processing within the processing chamber, if the turbidity is out of specification, in order to prevent damage to the semiconductor being processed.
- Regarding claim 22, the sensor is configured to monitor a percentage of solids present within a liquid of the process fluid to output the signal indicative of the turbidity of the process fluid, since turbidity is directly related to the percentage of solids present in a particular fluid.
- Regarding claims 23 and 24, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the system to control the sampling system to draw a sample of process fluid in order to eliminate human intervention and thereby make the system more efficient.

***Response to Arguments***

8. Applicant's arguments filed June 29, 2007 have been fully considered but they are not persuasive.

- Applicant argues that there is no evidence of record to support the statement that the system would be "more efficient" as baldly alleged by the Office, so therefore the rejection of claim 18 is improper.
  - o However, Simms was recited to teach providing a storage device configured to store historical data corresponding to

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a process fluid, and to provide a sampling system configured to provide the process fluid in a substantially static state. Simms clearly teaches providing more accuracy which would therefore lead to a more efficient system. See column 1, lines 5-9 of Simms.

- Applicant argues that Adams and Obeng taken alone and in combination fail to teach or suggest the claimed another sensor coupled with a supply connection configured to supply one of the components to the mixer.
  - o Applicant's broad recitation of "another sensor coupled with a supply connection" is disclosed in Adams, column 6, last 4 lines, and column 7, lines 44-53. Since the sensors are in combination in one or more feedback loops for controlling the characteristics of the recycled slurry, which is thoroughly "mixed" and blended (column 7, lines 44-53), the limitations of claim 27 are met.
- Applicant argues that Adams and Obeng taken alone and in combination fail to teach or suggest the claimed sensor configured to output a signal indicative of accumulation of particulate matter within the connection.
  - o As previously stated in the office action filed August 24, 2006, the sensor is inherently coupled with the connection and "configured" to output a signal indicative of accumulation of particles matter within the connection, since turbidity measurements inherently measure the amount

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of particles in a fluid, and therefore, the sensor is such "configured" .

- Applicant argues that Adams and Obeng taken alone or in combination fail to teach or suggest the claimed sensor configured to output the signal indicative of turbidity or the control system configured to control mixing of the components of the semiconductor workpiece process fluid responsive to the signal indicative of turbidity.
  - o As previously stated in the rejection above, Adams in view of Obeng discloses turbidity sensors which may be used for control for controlling the characteristics of the recycled slurry(column 6, lines 58-end), which is thoroughly mixed(column 7, lines 44-53). Thus, the sensor is "configured" to control mixing of the components of the semiconductor workpiece process fluid responsive to the signal indicative of turbidity.
- Applicant argues that the combination of references fail to teach or suggest the claimed comparison of the substantially static process fluid with a signature to determine at least one characteristic of the process fluid or the claimed control of the flow rate of the process fluid into the process chamber responsive to the comparison as claimed.
  - o As previously stated in the office action, the static process fluid must be compared with a signature, or at least the control system is "configured" make such a

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comparison and control a flow rate of the process fluid into the process chamber responsive to the comparison. Clearly, it would not make any sense to measure turbidity without making a comparison with a desired turbidity. In addition, applicant is not reciting a method, but a control system which is configured to perform functions and/or operations.

- Applicant argues that Adams and Obeng taken alone or in combination fail to teach or suggest the claimed control system configured to control the metering device to control a flow rate of the component responsive to the signal indicative of turbidity.
  - o Adams as modified, teaches using turbidity sensors for controlling the characteristics of recycled slurry(column 6, lines 58-end), which is directly related to a metering device(column 7, lines 3-7). Therefore, Adams, as modified, teaches the claimed control system "configured" to control the metering device to control a flow rate of the component responsive to the signal indicative of turbidity. In additive, applicant is not reciting a method, but a control system which is configured to perform functions and/or operations.
- Applicant argues that Adams and Obeng do not teach a recirculation system recirculating the process fluid to a homogeneous level.

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- o Page 8 of the rejection filed August 24, 2006, mentioned that (regarding claims 157-159) the recirculation system is configured to recirculate the process fluid to a homogeneous level to provide the process fluid having a turbidity within a desired range for application to the process chamber (this statement would apply to claim 139 also). Since Adams discloses mixing the recycled slurry, clearly the recirculation system is "configured" to produce a homogeneous level.
- Applicant argues that the Office baldly alleges on page 3 of the Action that Adams discloses the claimed recirculation system recirculating the process fluid to a homogeneous level.
  - o Applicant is totally incorrect. The examiner mentions on page 3 of the action, "a recirculation system configured to recirculate the process fluid to a homogenous level". However, as stated above, since Adams discloses mixing the recycled slurry, clearly the recirculation system is "configured" to produce a homogeneous level.
- Applicant argues that referring to claim 141, the prior art does not disclose any teaching of control of the mixing responsive to the signal as claimed.
  - o As previously stated in the rejection above, Adams in view of Obeng discloses turbidity sensors which may be used for control for controlling the characteristics of the recycled slurry (column 6, lines 58-end), which is thoroughly

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mixed(column 7, lines 44-53). Thus, the sensor is "configured" to control mixing of the components of the semiconductor workpiece process fluid responsive to the signal indicative of turbidity.

- Applicant argues that the features of claim 142 are not disclosed by the prior art.
  - o As previously stated above, the prior art as combined discloses a control system coupled with a sensor and "configured" to control mixing of the components responsive to the signal and the control system is "configured" to control the metering device to control the flow rate responsive to the signal.
- Applicant argues that the features of claim 143 are not disclosed by Adams and Obeng taken alone or in combination.
  - o However, Adams discloses another sensor "configured to output another signal indicative of one of the components" (see column 6, lines 64-end). In addition, Adams, as modified, discloses a control system "configured" to control mixing of the components responsive to the signal outputted by the first sensor as stated above.
- Applicant argues that there is insufficient factual basis for combining the references for rejecting claim 163, and thus the rejection is improper.
  - o This is not correct. As previously stated in the office action, the static process fluid must be compared with a

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signature, or at least the control system is "configured" to make such a comparison and control a flow rate of the process fluid into the process chamber responsive to the comparison. Clearly, it would not make any sense to measure turbidity without making a comparison with a desired turbidity. In addition, applicant is not reciting a method, but a control system which is configured to perform functions and/or operations.

- Applicant argues that the subject matter of claim 168 is not taught by the prior art.
  - o As stated above, Adams, as modified, teaches a control system configured to control the mixing system to mix the plural components using the signal indicative of the process fluid.
- The rejection mailed August 24, 2006, adequately applied the prior art to the claims with sufficient explanations for applicant to understand. It appears that applicant is attempting to claim somewhat broad subject matter which is clearly met by the prior art.

***Allowable Subject Matter***

9. Claims 1-5, 10, 11, 13-17, 39, 41-48, 58-62, 133-135, 165-167, 177, and 179-181 are allowed.
10. Claims 52, 131, 164, and 169 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in



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independent form including all of the limitations of the base claim and any intervening claims.

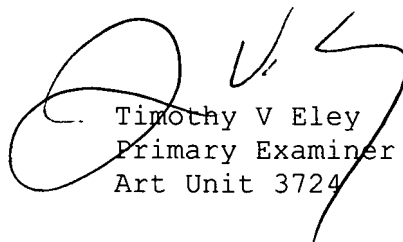
### **Conclusion**

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is 571-272-4506. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Boyer D. Ashley can be reached on 571-272-4502. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Timothy V Eley  
Primary Examiner  
Art Unit 3724

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